Timed Announcement and Billboard with Internet Access

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ABSTRACT

Announcement and advertisement board were designed and realized in this study. Data is sent to the board over the internet using UDP(User Datagram Protocol) protocol. The announcement data sent to the clipboard is printed on the clipboard at the specified time interval. A web interface has been created for sending announcement data. With the help of the EEPROM (Electronically Erasable Programmable Read-Only Memory) storage unit on the board, it can be ensured that the sent data can be stored and that the data is not lost even in case of any power failure. The most important feature of the implemented system is that it can access the system through the Internet through the UDP protocol without the need for a computer or equipment to be able to send data to the panel. The completed work includes four parts: Web server unit, Ethernet interface unit, control unit and led display unit.PIC18F4550 microcontroller is used in the control part and PIC16F887 microcontroller is used in the Ethernet interface part. The designed web server interface is written in C# programming language in ASP.NET. In addition, serial Ethernet card, RS232 communication protocol and UDP communication protocol were used in the study.

KEYWORDS: Control over the Internet, microcontroller, notice board, billboard, scrolling text

1. INTRODUCTION

The rapid development of technology and the increase in usage rate have affected the advertising industry and various fields of announcement methods that can be adopted. Earlier, making an announcement or advertisement was seen as a difficult task that takes time. The written and printed materials used increased the cost. In addition, in case of any changes in the announcement or advertisement, all these works must be done again. Signs and fabric posters where advertisements and announcements are made are gradually being replaced by digitally illuminated and screened products. Therefore, electronic advertising and billboards were needed. Electronic panels have become the most technological, easiest, cheapest and fastest way of doing the mentioned works and they have started to be used in every field. The use of electronic panels in all areas has brought the demand for remote control of these devices.

2. RELATED WORKS

The interactive wireless electronic notice board designed in the literature provided more information about the announcements by establishing a Bluetooth connection with mobile devices near the panel. (Liu etc. ,2004).

In the literature, a computer-controlled advertisement and notice board with a memory unit has designed and realized. The most important feature of this designed system is the wireless communication of the module to which the information is sent with the advertisement and notice board. Thanks to the memory unit on the advertisement and notice board, the continuity of the advertisement text is ensured even in case of power failure. The fact that the system is computer controlled has enabled the advertisement and announcement text on the billboard and memory unit to be changed and edited and the speed of the advertisement and announcement text to be adjusted (Çakır and Çalış, 2006).

Electronic information boards in the literature are controlled either locally or remotely over the web. Thus, spatial dependency has been eliminated and access to the electronic information board is provided in a fast, economical and safe manner with remote control. The most important advantage of such studies is that it provides this process safely and in the shortest time through any computer connected on the network instead of interfering with the computer to which the panel is connected to update data every time. (Fettahoğlu, 2007).

In this study, a led panel with time/date and memory unit integrations was designed and built which can control over the internet.The ability to control the system over the internet allows announcement or advertisement data to be sent from any internet-enabled device via any device that can be connected to the internet. Due to the time/date integration on the panel, the sent data can be printed on the led panel at any time.

3. TIMED ANNOUNCEMENT AND BILLBOARD WITH INTERNET ACCESS

The announcement and billboard consists of four units.These are;

- ➢ Web server unit
- ➢ Ethernet interface unit
- ➢ Control unit
- ➢ Led display unit

The block diagram of the study is shown in Figure 1.
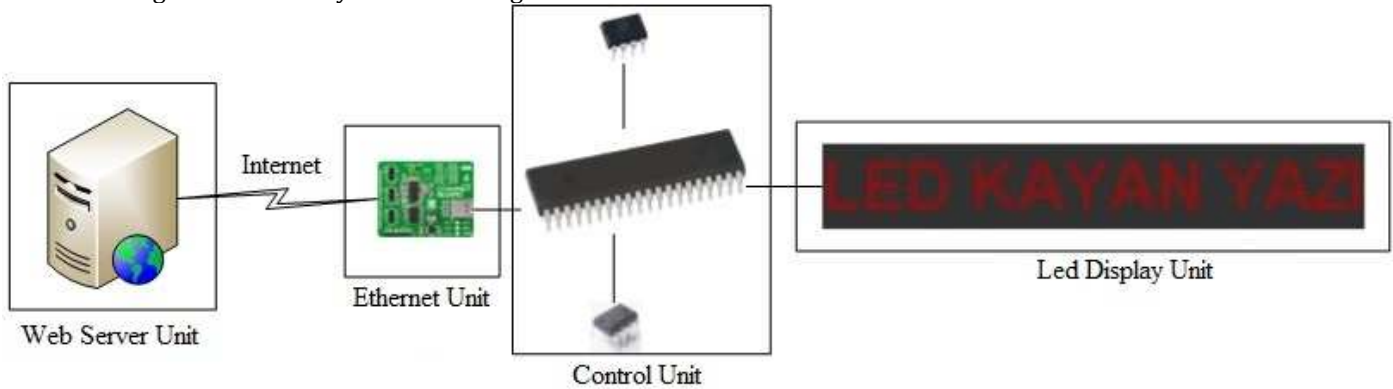
Figure 1. The block diagram of the Timed Announcement And Billboard With Internet Access

In order to send data to the announcement and advertisement board, it is necessary to connect to the web address of the web interface and log in as a user. After the user logs in, fill in the text field, time/date field in the text field on the announcement submission page, and then click the "Send" button. In this way, the announcement or advertisement data will be sent to the board via the UDP protocol. The serial Ethernet card receives the data on the board and transmits it to the PIC18f4550 microcontroller in the control unit. This microcontroller saves the received data to EEPROM according to the announcement number, and when the time comes, sends it to the led display section and enables it to be printed.

3.1. Web Server Unit

A computer or server is set up as a web server in order to send data to the announcement and billboard. Since the written interface program was written in ASP source code, the Internet Information Service (IIS) was installed and adjusted on the web server. One point to note here is that the web server has a fixed and real IP. The reason for giving the server real IP is to allow the web page to be connected from anywhere in the world.

In order to ensure the security of the designed web page and to restrict the use of unauthorized persons, a login page was created. By selecting the desired menu from the page opened after the user is logged in; It is possible to send announcements, change the clock of the board, check the past dated announcements and change the user password.

On the announcement submission page there is an announcement field for a maximum of two hundred characters, a date and time fields where we can enter start and end date times, an announcement number selection box where we can select the publication number of the data to be sent, a shift speed selection box in which the shift speed of the sent data is selected; a shift direction selection box in which the shift direction of the data is selected. After the required information is entered, the announcement data is sent to the clipboard by clicking the send button, and the announcement is recorded in the database.

3.2. Ethernet Unit

The Ethernet unit is the part that receives the data on the board. The IP address assigned to the serial Ethernet interface card is real and fixed. Port 443 is used for data exchange between the web interface and the board. In this way, unnecessary data to the clipboard is prevented from being acquired. Receive data entering the panel through port 443 and UDP protocol. The received data is transmitted to the control unit through the RS232 communication protocol.

Figure 2 shows the top view of the Ethernet unit.PIC16F887 microcontroller is used to drive the serial Ethernet card in the Ethernet unit.
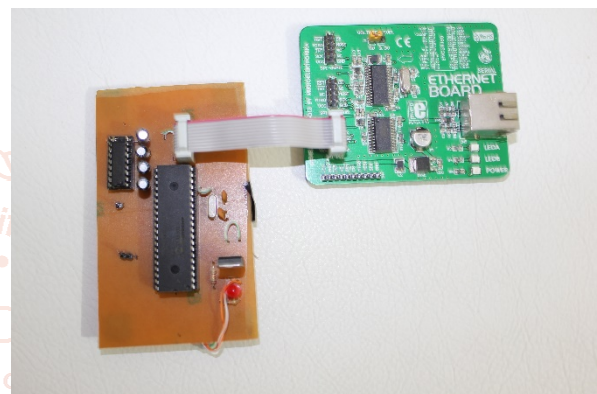
Figure 2. Ethernet Unit

3.3. Control Unit

The control unit is the part that processes the data entering the panel, the time of the announcement data in the memory unit is checked and the necessary actions are taken to print the data that is due.

With the AT24C08 EEPROM in the control unit, it is ensured that the data coming to the panel is kept even in case of power failure. Real-time clock/date integrated DS1307 was used to control the publication time of announcement or advertisement data.

The PIC18F4550 microcontroller, programmed in the control unit, first reads the start and end times of the first announcement from the eeprom, then receives the time information from the clock/IC and makes a comparison. During the announcement broadcast time, the announcement text is taken from the eeprom and transfered to the led display unit using RS232 communication protocol. The pins of the microcontrollers in the control unit and the led display unit are connected to each other. Via this pin; while an announcement is displayed in the led display unit, the control unit does not send any other data to the led display unit, it only processes the data coming from the Ethernet unit. After the writing process of an announcement is finished, the start and end dates of the other announcement are compared by reading the time data from the time/date integrated, and all announcements are published according to the time by repeating the processes as in the previous announcement.

3.4. Led Display Unit

The led display unit is the section where the data coming from the control unit via serial communication are printed on the led panel according to the speed and direction

information from the control unit. The print screen consists of 7 rows and 48 columns. The positive ends of the LEDs in each row of the screen and the negative ends of the LEDs in each column are connected in common.

Announcement data is first split into columns according to characters and transferred to an array. The column data of letters, numbers and characters have been predefined in the microcontroller located in the LED display unit.

The first bits of the first 48 of the divided lines are sent to the serial input parallel output integration respectively, so that the first line data is loaded. After the row loading process, the first row entry is set to logic "1" and the loaded data is displayed on the first row. Then, the column data is moved one bit to the left, and the second bit is taken out and loaded into the integrated serial input and parallel output. After the second bits of the columns are loaded, the second row entry is made logical "1" and the second row data is seen. In this way, after all rows are processed, the columns are shifted to the left once and the row loading process is done again. Since this process will be fast, the text will appear to be sliding on the screen. After all the columns are printed, the control unit is informed that the incoming data has been printed.

Announcements can be scrolled on the led panel in 4 different ways; from left to right, from right to left, from top to bottom or from bottom to top.

If all the LEDs in a row on the panel light up, a current of approximately 1 ampere is required. Since it is not possible for the microcontroller to meet this current value, BDX54C integrated circuit has been used between the microcontroller and the line input.

4. CONCLUSIONS

In the work done, sending and writing data to an announcement and billboard over the internet were carried out. A webpage written in the Asp programming language sends data to the panel, which uses the UDP protocol to obtain the real IP through port 443.Username and password are used to ensure the security of the web page. The data sent to the board is saved in the EEPROM, even if the power is off, the data is protected. Since time/date integration is used in the circuit, it can ensure that announcements are broadcast at the required date and time interval.

The most important advantage of the study is that there is no need for a computer or server that is physically connected to the board. In this way, the user is saved from costs such as procurement, maintenance and adjustment of the server.

In the study, it can be seen as a disadvantage that the web server communicates with the board using the UDP protocol, albeit fast. Because in the UDP protocol, there is no guarantee that the data reaches the destination. By using the TCP protocol between the server and the board, the data can be guaranteed to reach the board. Temperature and humidity sensor can be added to the board and the temperature of the environment and the humidity value of the environment can be printed on the screen between the announcements.

5. REFERENCES

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